

In the Claims

1. (Previously Amended May 12, 2003) An eye viewing device comprising:
 - a housing having an observer end and a patient end;
 - an illumination system at least partially disposed in said housing;
 - an imaging system at least partially disposed in said housing;
 - an image sensor ~~for~~ generating image signals;
 - a processor system ~~for~~ processing image information corresponding to image signals generated by said image sensor;
 - a module holder defined by said housing at said observer end; and
 - a replaceable module comprising at least said image sensor replaceably received in said holder.
2. (Original) The eye viewing device of claim 1, wherein said replaceable module further comprises said processor system.
3. (Original) The eye viewing device of claim 1, further comprising an electronic display in communication with said processor system.
4. (Previously Amended May 12, 2003) The eye viewing device of claim 1, wherein said replaceable module further comprises a display in communication with said processor system.
5. (Currently Amended) The eye viewing device of claim 4, wherein said display is externally mounted on said module.
6. (Currently Amended) The eye viewing device of claim 4, wherein said display is externally mounted on a face of said module.

7. (Currently Amended) The eye viewing device of claim 4, wherein said display is rigidly mounted on said module.

8. (Currently Amended) The eye viewing device of claim 4, wherein said display is internally mounted in an interior of said module.

9. (Currently Amended) The eye viewing device of claim 4, wherein said display is mounted on a top of said housing.

10. (Previously Amended May 12, 2003 Amended) The eye viewing device of claim 1, wherein said device includes a head worn display apparatus which includes a display.

11. (Previously Amended May 12, 2003) The eye viewing device of claim 1, wherein said device includes a communication link component facilitating communication of image information externally from said housing.

12. (Currently Amended) The eye viewing device of claim 11, wherein said replaceable module further comprises said communication link.

13. (Previously Amended May 12, 2003) The eye viewing device of claim 11, wherein said communication link includes a cable.

14. (Previously Amended May 12, 2003) The eye viewing device of claim 11, wherein said communication link comprises a wireless communication link.

15. (Previously Amended May 12, 2003) The eye viewing device of claim 11, wherein said communication link comprises a transportable memory structure.

16. (Original) The eye viewing device of claim 2, further comprising an electronic display.

17. (Previously Amended May 12, 2003) The eye viewing device of claim 11, wherein said device further includes an electronic display spaced apart from said housing and said module, and in communication with said communication link.

18. (Previously Amended May 12, 2003) The eye viewing device of claim 1, wherein said housing and said module include complementary mating electrical connectors which are adapted to mate when said module is received in said holder.

19. (Currently Amended) The eye viewing device of claim 18, wherein said processor system is incorporated in said housing and wherein said mating electrical connectors are adapted to provide breakable communication between said image sensor and said processor system.

20. (Currently Amended) The eye viewing device of claim 18, wherein said processor system is incorporated in said module, and wherein said device further includes a display mounted on said housing, wherein said mating electrical connectors provide breakable communication between said processor system and said display.

21. (Original) The device of claim 3, wherein said device includes a battery power supply incorporated in said housing, wherein said mating connectors provide breakable communication between an electronic component of said module and said power supply.

22. (Previously Amended May 12, 2003) The device of claim 3, wherein said module further comprises a communication link component facilitating communication of image information externally from said housing.

Claims 23-45 (Previously Cancelled May 12, 2003)

46. (Currently Amended) An eye viewing device system comprising:
- a housing having an observer end and a patient end;
 - an illumination system at least partially disposed in said housing;
 - an imaging system at least partially disposed in said housing;
 - a module holder defined by said housing at said observer end; and
 - at least first and second replaceable modules, each replaceably receivable in said holder, said holder adapted to receive one of said modules at a given time, wherein said first module comprises an eyepiece lens ~~for~~ facilitating direct view of an eye structure and said second module comprises at least an image sensor ~~for~~ generating image signals corresponding to an eye structure.
47. (Original) The system of claim 46, wherein said second module further comprises an electronic display.
48. (Original) The system of claim 46, wherein said second module further comprises a face mounted display.
49. (Original) The system of claim 46, wherein said second module further comprises an externally mounted display.
50. (Original) The system of claim 46, wherein said second module further comprises an electronic display mounted in an interior of said module.
51. (Original) The system of claim 46, further comprising a communication link component for facilitating communication of image information from said housing.

52. (Original) The system of claim 46, wherein said housing is a hand-held housing.

53. (Original) The system of claim 46, wherein said holder and said second module comprise complementary mating connectors.

54. (Previously Presented May 12, 2003) The system of claim 46, wherein said illumination system projects a converging cone of light.

55. (Previously Presented May 12, 2003) The system of claim 46, wherein said illumination system and said imaging system include a common objective lens.

56. (Previously Presented May 12, 2003) The system of claim 46, wherein said illumination system projects a converging cone of light converging at an apex, and wherein said imaging system includes an aperture stop disposed to be substantially coaxial with respect to an imaging axis of said imaging system and substantially conjugate said apex.

57. (Previously Presented May 12, 2003) The system of claim 46, wherein said imaging system includes an aperture stop, and wherein said eye viewing device includes an objective lens and an internal light source, wherein a surface of said objective lens closest to said light source is curved substantially concentric about a center of an aperture of said aperture stop, whereby internal glare in said device is reduced.

58. (Previously Presented May 12, 2003) The system of claim 46, wherein said illumination system projects through a pupil, and wherein said imaging system includes an aperture disposed substantially coaxial about an imaging axis of said imaging system and substantially conjugate said pupil, when said illumination system projects substantially a maximum amount of light through said pupil.

59. (Previously Presented May 12, 2003) The eye viewing device of claim 1, wherein said housing is hand held, and wherein said device is configured for viewing a retina.

60. (Previously Presented May 12, 2003) The eye viewing device of claim 1, wherein said housing is hand held, wherein said device is configured for viewing a retina, and wherein said replaceable module further comprises said processor system.

61. (Previously Presented May 12, 2003) The eye viewing device of claim 1, wherein said housing is hand held, wherein said device is configured for viewing a retina, wherein said replaceable module further comprises said processor system, and wherein said eye viewing device further includes an electronic display in communication with said processor system.

62. (Previously Presented May 12, 2003) The eye viewing device of claim 1, wherein said housing is hand held, wherein said device is configured for viewing a retina, wherein said replaceable module further includes a display in communication with said processor system, and wherein said display is externally mounted on said replaceable module.

63. (Previously Presented May 12, 2003) The eye viewing device of claim 1, wherein said housing is hand held, wherein said device is configured for viewing a retina, wherein said replaceable module further includes a display in communication with said processor system, and wherein said display is externally mounted on a face of said module.

64. (Previously Presented May 12, 2003) The eye viewing device of claim 1, wherein said housing is hand held, wherein said device is configured for viewing a retina, wherein said replaceable module further includes a display in communication with said processor system, and wherein said display is rigidly mounted on said module.

65. (Previously Presented May 12, 2003) The eye viewing device of claim 1, wherein said housing is hand held, wherein said device is configured for viewing a retina, wherein said replaceable module further includes a display in communication with said processor system, and wherein said display is internally mounted in an interior of said module.

66. (Previously Presented May 12, 2003) The eye viewing device of claim 1, wherein said housing is hand held, wherein said device is configured for viewing a retina, wherein said replaceable module further includes a display in communication with said processor system, and wherein said display is mounted on a top of said module.

67. (Previously Presented May 12, 2003) The eye viewing device of claim 1, wherein said illumination system projects a converging cone of light.

68. (Previously Presented May 12, 2003) The eye viewing device of claim 1, wherein said illumination system projects a converging cone of light converging at an apex, and wherein said imaging system includes an aperture stop disposed conjugate to said apex.

69. (Previously Presented May 12, 2003) The eye viewing device of claim 2, wherein said imaging system includes an aperture stop disposed so that said aperture stop is substantially conjugate a pupil of a patient when said device is in an operative position.

70. (Previously Presented May 12, 2003) The eye viewing device of claim 1, wherein said imaging system includes an aperture stop and an objective lens, and wherein said illumination system includes a light source, and wherein a surface of said objective lens closest said light source is curved substantially concentric about an aperture of said aperture stop.

71. (Previously Presented May 12, 2003) A retinal viewing device system comprising:
a hand held housing having an observer end and a patient end;
an illumination system at least partially disposed in said housing;
an imaging system at least partially disposed in said housing;
a module holder defined by said housing at said observer end; and
at least first and second replaceable modules, each replaceably receivable in said holder, said holder adapted to receive one of said modules at a given time, wherein said first module comprises an eyepiece lens facilitating direct view of an eye structure and said second module comprises at least an image sensor for generating image signals corresponding to an eye structure.

72. (Previously Presented May 12, 2003) The system of claim 71, wherein said second module further comprises an electronic display.

73. (Previously Presented May 12, 2003) The system of claim 71, wherein said second module further comprises a face mounted display.

74. (Previously Presented May 12, 2003) The system of claim 71, wherein said second module further comprises an externally mounted display.

75. (Previously Presented May 12, 2003) The system of claim 71, wherein said second module further comprises an electronic display mounted in an interior of said module.

76. (Previously Presented May 12, 2003) The system of claim 71, further comprising a communication link component for facilitating communication of image information from said housing.

77. (Previously Presented May 12, 2003) The system of claim 71, wherein said

illumination system includes a light generating light source, wherein said housing includes a first part extending coextensively with an imaging axis of said imaging system, and a second part extending transverse to said first part, and wherein said light generating light source is disposed in said second part.

78. (Previously Presented May 12, 2003) The system of claim 71, wherein said holder and said second module comprise complementary mating connectors.

79. (Previously Presented May 12, 2003) The system of claim 71, wherein said illumination system projects a converging cone of light.

80. (Previously Presented May 12, 2003) The system of claim 71, wherein said illumination system and said imaging system include a common objective lens.

81. (Previously Presented May 12, 2003) The system of claim 71, wherein said illumination system projects a converging cone of light converging at an apex, and wherein said imaging system includes an aperture stop disposed to be substantially coaxial with respect to an imaging axis of said imaging system and substantially conjugate said apex.

82. (Previously Presented May 12, 2003) The system of claim 71, wherein said imaging system includes an aperture stop, and wherein said eye viewing device includes an objective lens and an internal light source, wherein a surface of said objective lens closest to said light source is curved substantially concentric about a center of an aperture of said aperture stop, whereby internal glare in said device is reduced.

83. (Previously Presented May 12, 2003) The system of claim 71, wherein said illumination system projects light through a pupil, and wherein said imaging system includes an aperture disposed substantially coaxial about an imaging axis of said imaging system and

substantially conjugate said pupil, when said eye viewing device is in an operative position.

84. (Currently Amended) A hand held retina viewing device comprising:

a housing;

an image sensor;

an imaging system including an imaging axis;

an illumination system configured to project light through a pupil; and

a moving mirror disposed in said housing moveable between a first position at which a retinal image focal plane is defined at an active surface of said image sensor and a second position permitting visual viewing of said retina,

wherein said imaging system includes an aperture stop disposed in said housing substantially coaxially about said imaging axis and substantially conjugate said pupil ~~wherein~~ when said device is in an operative position.

85. (Previously Presented May 12, 2003) The device of claim 84, further including a holder receiving a replaceable module, and wherein said moving mirror is incorporated in a replaceable module replaceably received in said holder.

86. (Currently Amended) The eye viewing device of claim 84, wherein an aperture of said aperture stop is sized to substantially correspond to a size of ~~said~~ a pupil.

87. (Currently Amended) The eye viewing device of claim 84, wherein an aperture of said aperture stop is sized substantially according to the formula, $d=2m$ millimeters, where d is a diameter of the aperture and m is the magnification of ~~said~~ a pupil in a plane of said aperture stop.

88. (Previously Presented May 12, 2003) The eye viewing device of claim 84, wherein said illumination system includes a light source positioned off-axis with respect to said imaging

axis, whereby internal and corneal glare in said device is reduced.

89. (Previously Presented May 12, 2003) The eye viewing device of claim 84, wherein said off-axis positioned light source is a light generating light source.

90. (Previously Presented May 12, 2003) The eye viewing device of claim 84, wherein said off-axis positioned light source is provided by a light reflective element.

91. (Previously Presented May 12, 2003) The eye viewing device of claim 84, wherein said imaging system includes an objective lens and said illumination system includes a light source, said objective lens having a first surface closest to said light source curved substantially concentric about a center of an aperture of said aperture stop, whereby internal glare in said device is reduced.

92. (Previously Presented May 12, 2003) The eye viewing device of claim 84, wherein said illumination system includes a light source positioned outside of a border between received and blocked light defined by said aperture stop, whereby said light source has no obscuring effect on images received by said viewing device.

93. (Previously Presented May 12, 2003) The eye viewing device of claim 84, wherein said illumination system includes a light source positioned outside of a border between received and blocked light defined by said aperture stop and wherein said imaging system includes an objective lens having a curved first surface curved concentric about a center of an aperture of said aperture stop, whereby said light source has no obscuring effect on images received by said viewing device, and whereby incident light reflected from said first surface is blocked by said aperture stop.

94. (Previously Presented May 12, 2003) The eye viewing device of claim 84, wherein

said imaging system is devoid of a beam splitter.

95. (Previously Presented May 12, 2003) The eye viewing device of claim 84, wherein a retinal field of view of said imaging system is larger than a retinal area of illumination of said illumination system.

96. (Previously Presented May 12, 2003) The eye viewing device of claim 84, wherein a retinal field of view of said imaging system is between about 15 to 30 percent larger than a retinal area of illumination of said illumination system.

97. (Previously Presented May 12, 2003) The eye viewing device of claim 84, wherein said aperture stop is disposed in said device so that said aperture stop is substantially conjugate to said pupil when said illumination system projects substantially a maximum amount of light through said pupil.

98. (Previously Presented May 12, 2003) The eye viewing device of claim 84, wherein said imaging system includes an objective lens disposed in a path of illumination light rays generated by said illumination system.

99. (Previously Presented May 12, 2003) The eye viewing device of claim 84, wherein said illumination system includes an objective lens disposed so that said imaging axis intersects said objective lens.

100. (Previously Presented May 12, 2003) A hand held retina viewing device comprising:
a housing;
an image sensor;
an imaging system including an imaging axis;
an illumination system projecting a converging cone of light converging at an

apex and diverging thereafter; and

a moving mirror disposed in said housing moveable between a first position at which a retinal image focal plane is defined at an active surface of said image sensor and a second position permitting visual viewing of said retina,

wherein said imaging system further includes an aperture stop disposed in said housing substantially conjugate to said apex.

101. (Previously Presented May 12, 2003) The device of claim 100, further including a holder receiving a replaceable module, and wherein said moving mirror is incorporated in a replaceable module replaceably received in said holder.

102. (Currently Amended) The eye viewing device of claim 100, wherein an aperture stop is sized to substantially correspond to a size of ~~said~~ a pupil.

103. (Currently Amended) The eye viewing device of claim 100, wherein an aperture of said aperture stop is sized substantially according to the formula $d=2\ m$ millimeters where d is a diameter of the aperture and m is the magnification of said pupil in a plane of ~~said~~ a aperture stop.

104. (Previously Presented May 12, 2003) The eye viewing device of claim 100, wherein said illumination system includes a light source positioned off-axis with respect to said imaging axis, whereby internal and corneal glare in said device is reduced.

105. (Previously Presented May 12, 2003) The eye viewing device of claim 104, wherein said off-axis positioned light source is a light generating light source.

106. (Previously Presented May 12, 2003) The eye viewing device of claim 104, wherein said off-axis positioned light source is provided by a light reflective element.

107. (Previously Presented May 12, 2003) The eye viewing device of claim 100, wherein said imaging system includes an objective lens and said illumination system includes a light source, said objective lens having a first surface closest to said light source curved substantially concentric about a center of an aperture of said aperture stop, whereby internal glare in said device is reduced.

108. (Currently Amended) The eye viewing device of claim 100, ~~where~~ wherein said illumination system includes a light source positioned outside of a border between received and blocked light defined by said aperture stop, whereby said light source has no obscuring effect on images received by said viewing device.

109. (Previously Presented May 12, 2003) The eye viewing device of claim 100, wherein said illumination system includes a light source positioned outside of a border between received and blocked light defined by said aperture stop and wherein said imaging system includes an objective lens having a curved first surface curved concentric about a center of an aperture of said aperture stop, whereby said light source has no obscuring effect on images received by said viewing device, and whereby incident light reflected from said first surface is blocked by said aperture stop.

110. (Previously Presented May 12, 2003) The eye viewing device of claim 100, wherein said device is devoid of a beam splitter.

111. (Previously Presented May 12, 2003) The eye viewing device of claim 100, wherein a retinal field of view of said imaging system is larger than a retinal area of illumination of said illumination system.

112. (Previously Presented May 12, 2003) The eye viewing device of claim 100, wherein a retinal field of view of said imaging system is between about 15 to 30 percent larger than a retinal area of illumination of said illumination system.

113. (Previously Presented May 12, 2003) The eye viewing device of claim 100, wherein said aperture stop is disposed in said device so that said aperture stop is substantially conjugate to said pupil when said illumination system projects substantially a maximum amount of light through said pupil.

114. (Previously Presented May 12, 2003) The eye viewing device of claim 100, wherein said imaging system includes an objective lens disposed in a path of illumination light rays generated by said illumination system.

115. (Previously Presented May 12, 2003) The eye viewing device of claim 100, wherein said illumination system includes an objective lens disposed so that said imaging axis intersects said objective lens.

116. (Previously Presented May 12, 2003) A hand held retina viewing device comprising:

- a housing;
- an image sensor;
- an imaging system including an imaging axis and an aperture stop;
- an illumination system including a light source; and
- a moving mirror disposed in said housing moveable between a first position at which a retinal image focal plane is defined at an active surface of said image sensor and a second position permitting visual viewing of said retina,

wherein said imaging system further includes an objective lens having a surface closest to said light source curved substantially concentric about a center of an aperture of said aperture stop, whereby internal glare in said device is reduced.

117. (Previously Presented May 12, 2003) The device of claim 116, further including a holder receiving a replaceable module, and wherein said moving mirror is incorporated in said replaceable module replaceably received in said holder.

118. (Currently Amended) The eye viewing device of claim 116, wherein an aperture stop is sized to substantially correspond to a size of ~~said~~ a pupil.

119. (Currently Amended) The eye viewing device of claim 116, wherein an aperture of said aperture stop is sized substantially according to the formula $d=2\ m$ millimeters where d is a diameter of the aperture and m is the magnification of said pupil in a plane of ~~said~~ a aperture stop.

120. (Previously Presented May 12, 2003) The eye viewing device of claim 116, wherein said illumination system includes a light source positioned off-axis with respect to said imaging axis, whereby internal and corneal glare in said device is reduced.

121. (Previously Presented May 12, 2003) The eye viewing device of claim 116, wherein said off-axis positioned light source is a light generating light source.

122. (Previously Presented May 12, 2003) The eye viewing device of claim 116, wherein said off-axis positioned light source is provided by a light reflective element.

123. (Cancelled Without Prejudice or Disclaimer)

124. (Currently Amended) The eye viewing device of claim 116, ~~where~~ wherein said illumination system includes a light source positioned outside of a border between received and blocked light defined by said aperture stop, whereby said light source has no obscuring effect on images received by said viewing device.

125. (Previously Presented May 12, 2003) The eye viewing device of claim 116, wherein said illumination system includes a light source positioned outside of a border between received and blocked light defined by said aperture stop and wherein said imaging system includes an objective lens having a curved first surface curved concentric about a center of an aperture of said aperture stop, whereby said light source has no obscuring effect on images received by said viewing device, and whereby incident light reflected from said first surface is blocked by said aperture stop.

126. (Previously Presented May 12, 2003) The eye viewing device of claim 116, wherein said device is devoid of a beam splitter.

127. (Previously Presented May 12, 2003) The eye viewing device of claim 116, wherein a retinal field of view of said imaging system is larger than a retinal area of illumination of said illumination system.

128. (Previously Presented May 12, 2003) The eye viewing device of claim 116, wherein a retinal field of view of said imaging system is between about 15 to 30 percent larger than a retinal area of illumination of said illumination system.

129. (Previously Presented May 12, 2003) The eye viewing device of claim 116, wherein said aperture stop is disposed in said device so that said aperture stop is substantially conjugate to said pupil when said illumination system projects substantially a maximum amount of light through said pupil.

130. (Previously Presented May 12, 2003) The eye viewing device of claim 116, wherein said imaging system includes an objective lens disposed in a path of illumination light rays generated by said illumination system.

131. (Previously Presented May 12, 2003) The eye viewing device of claim 116, wherein said illumination system includes an objective lens disposed so that said imaging axis intersects said objective lens.

REMARKS

Applicants submit the present amendment after allowance to correct minor informalities. Applicants cancel claim 123 for the reason that it recites limitations already recited in the base claim on which it depends. Entry of the presented amendments should be made as a matter of right. The proposed amendments do not alter the scope of any claim. Further, a request for continued examination (RCE) is contemporaneously filed. Therefore, even if the presented amendments did alter the claim scope (which they do not) their entry would still be proper.

Respectfully submitted,

WALL MARJAMA & BILINSKI

A handwritten signature in black ink, appearing to read "George S. Blasiak".

George S. Blasiak

Registration No. 37,283

GSB/bs

Customer No. 20874

315-425-9000

315-425-9114 (Fax)